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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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09/762,779 07/03/01 TERLINGEN

J 702-010166

EXAMINER

HM12/1024

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COUNTS, G

| ART UNIT | PAPER NUMBER |
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1641

DATE MAILED:

10/24/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/762,779

Applicant(s)

TERLINGEN ET AL.

Examiner

Gary W. Counts

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Specification

2. The disclosure is objected to because of the following informalities:

Page 2, line 23 "claims 1-8" are no longer a part of the application.

Page 2, line 34 "claims 9-19" are no longer a part of the application.

Page 3, line 8 "substract" should be --substrate--.

Page 3, line 12 "in" should be --is--.

Page 4, line 38 "claims 14 or 15" are no longer a part of the application.

Appropriate correction is required.

Claim Objections

3. Claims 26,-28 and 31are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 26 the recitation "the plasma deposited layer is supported on a substrate" is already disclosed in independent claim 25.

Claim 27 the recitation "a film of a free electron metal" is already disclosed in independent claim 25.

Claim 28 the recitation "of copper, silver, aluminum and gold" fails to further limit the recitation "gold" in independent claim 25.

Claim 31 the recitation "amine compounds" fails to further limit the recitation "sulphur" in independent claim 25.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 25-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25, line 4 the recitation "in turn" is vague and indefinite. It is unclear what the term refers to.

Claim 33, line 1 the recitation "for providing" is vague and indefinite. It is unclear what the term refers to. Line 3 "in turn" is also vague and indefinite. It is unclear what the term refers to.

Claim 39 the recitation "treated in an after glow" is vague and indefinite. It is unclear what the term refers to.

Claim 42, line 1 the recitation "suitable for allowing investigation" is vague and indefinite. It is unclear what applicant intends.

Claim 46, line 5 the recitation "is chosen" is vague and indefinite. It is unclear what applicant intends. Line 6 the recitation "its specificity" is vague and indefinite. It is unclear what the term refers to.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 25-34, 37- 40, 44, 45 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al (EP 0104608) in view of Gardella et al (US Patent 5,627,079).

Dunn et al disclose a method and apparatus for modifying the surface chemistry of a substrate. Dunn et al teach that the attachment and orientation of biologically active molecules can be controlled by varying the surface chemistry of a metal substrate surface by using plasma modification techniques which yield a range of surface chemistries and properties (page 4, lines 1-9). Dunn et al teach that these modified polymeric surfaces were subjected to solutions of biologically active molecules and subsequently tested to demonstrate that attachment and orientation of the large molecule is highly dependent on surface chemistry (page 4, lines 10-16). Dunn et al teach that when the substrate is a metal, it is desirable to include a carbon source, such as methane to provide a thin organic layer on the inorganic substrate. Dunn et al also teach that the surface of the substrate is irreversibly modified by grafting specific chemical functional groups onto the surface with a plasma of suitable material such as sulfur (page 5, lines 1-25). Dunn et al teach that plasmas can be generated by use of DC or AC sources having a frequency of about 1.0W to about 10 kw. Dunn et al also

teach the use of radio frequency (r.f.) sources to generate plasmas (page 9, lines 14-30). Dunn et al disclose that r.f. plasmas are generated at a frequency of from about 1.0 to about 300 MHz at a power to initiate breakdown, such as from about 5 to about 1000 watts at pressures ranging from 0.001 to 10 Torr. The articles are subjected to the r.f. plasma for a period of about 0.1 seconds to about 120 minutes and the plasma treatment can be followed by a quench cycle at or near the surface with pressures ranging from 1 Torr to 760 Torr for time periods of 1 second to 4 hours (page 10, lines 6-19).

Dunn et al differ from the instant invention in failing to disclose the use of gold on the substrate and also fail to teach the substrate being treated in an after-glow.

Gardella et al (US Patent 5,627,079) disclose a method for making refunctionalized oxyfluorinated substrates. Gardella disclose the steps of providing a non-fluorinated base metallic material and modifying the surface of the base material by coating with a fluorocarbon film; and modifying the metallic substrates by coating with a fluorocarbon film and oxyfluorinating the modified surface of the metallic substrate with a gas/vapor plasma mixture and exposing the substrate to at least one radio frequency glow discharge (col 4, lines 50-67). Gardella et al teach that the base materials or substrates may be comprised of gold (col 8, lines 12-14). This method has increased wettability towards low surface tension liquids, as well as chemically reactive sites allowing for attachment of various chemical functionalities to normally inert surfaces and makes them especially adaptable for membrane applications (col 4, lines 32-37).

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It would have been obvious to one of ordinary skill in the art to incorporate the use of gold and the radio frequency glow discharge as taught by Gardella et al into the method of Dunn et al because Gardella et al shows this method has increased wettability towards low surface tension liquids, as well as chemically reactive sites allowing for attachment of various chemical functionalities to normally inert surfaces and makes them especially adaptable for membrane applications.

With respect to the conditions for gas plasma deposition recited in the instant claims, the optimum conditions for discharge power, exposure duration, plasma gas flow, pressure and frequency can be determined by routine experimentation and thus would have been obvious to one of ordinary skill in the art.

7. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al in view of Gardella et al as applied to claims 25-34, 37-40, 44, 45 and 48 above, and further in view of Kolluri et al (US Patent 5,723,219).

See above for teachings of Dunn et al and Gardella et al.

Dunn et al differ from the instant invention in failing to disclose that plasma is deposited from a monomer in gas form.

Kolluri et al teaches the use of a gas monomer in plasma polymerization techniques. Kolluri et al teach that the use of these monomers allow for the determination of a desired surface chemistry (col 5, lines 31-39).

It would have been obvious to one of ordinary skill in the art to incorporate the monomer as taught by Kolluri into the method of Dunn et al as modified by Gardella et

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al because Kolluri et al shows that the use of these monomers allow for the determination of a desired surface chemistry.

8. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al in view of Gardella et al as applied to claims 25-34, 37-40, 44, 45 and 48 above, and further in view of Sluka et al (US Patent 5,932,296).

See above for teachings of Dunn et al and Gardella et al.

Dunn et al differ from the instant invention in failing to teach the cleaning of the substrate.

Sluka et al teach the step of cleaning the substrate by means of a pulsed argon plasma before the application of the functional groups to the substrate (col 3, lines 21-24). This process would allow for the removal of any possible surface contamination and allow the surface to be specifically furnished with specific binding sites which are capable of binding directly to an analyte or specific binding partner of interest (col 4, lines 13-15).

It would have been obvious to one of ordinary skill in the art to incorporate the cleaning step as taught by Sluka et al into the method of Dunn et al as modified by Gardella et al because Sluka et al shows that this allows the surface to be specifically furnished with specific binding sites which are capable of binding directly to an analyte or specific binding partner of interest.

9. Claims 41-43, 46 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al in view of Gardella et al as applied to claims 25-34, 37-40, 44, 45 and 48 above, and further in view of Salamon et al (US Patent 5,991,488).

See above for teachings of Dunn et al and Gardella et al.

Dunn et al differ from the instant invention in failing to disclose the use of surface plasmon resonance spectroscopy to investigate reactions between interactive bio/chemical species.

Salamon et al teach that a surface plasmon is an oscillation of free electrons that propagates along a conductor surface of a thin film of metal such as gold. Salamon et al teach that surface plasmon resonance occurs under total internal reflection conditions at the boundary between substances of different refractive indices. Salamon et al teach that an incident light beam is reflected internally within the first medium, its electromagnetic field produces an evanescent wave that crosses a short distance beyond the interface with a second medium. If a thin metal film is inserted at the interface between the two media, surface plasmon resonance occurs when the free electron clouds in the metal layer absorb energy from the evanescent wave and cause a measurable drop in the intensity of the reflected light at a particular angle of incidence that depends on the refractive index of the second medium (col 1, lines 39-57).

Salamon et al also teaches that surface plasmon resonance is one of the most sensitive techniques to surface and interface effects and is useful for nondestructive studies of surfaces, interfaces, and very thin layers and is also useful as an optical technique for immunoassays (col 1, lines 32-38).

It would have been obvious to one of ordinary skill in the art to incorporate the surface plasmon resonance spectrometry as taught by Salamon et al into the method of Dunn et al as modified by Gardella et al because Salamon et al teach that it is one of

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the most sensitive techniques to surface and interface effects and is useful for nondestructive studies of surfaces, interfaces, and very thin layers and is also useful as an optical technique for immunoassays.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Timmons et al (US Patent 5,876,753) disclose a process for preparing a solid surface attached to a target material. The process includes fixing a carbonaceous compound having a reactive functional group to a surface by low power plasma deposition.

Giordano et al (US Patent 4,938,995) disclose a process for the deposition of an oxygen-containing high fluoropolymer thin film onto an appropriate substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary W. Counts whose telephone number is (703) 305-1444. The examiner can normally be reached on M-F 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (703) 305-3399. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-4242 for regular communications and (703)3084242 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

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Gary Counts

Gary W. Counts
Examiner
Art Unit 1641
October 22, 2001

Long V. Le

LONG V. LE
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10/22/01